Women's Empowerment in the Context of Rural West Bengal: An Index Construction with Exploratory Factor Analysis

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Abstract

Background: Women's empowerment, a precondition of sustainable development, is a multidimensional and complex concept, often described with three interrelated components: resources, agency, and achievement. There is no universal construct for women's empowerment; rather, it has been assessed based on the context. It had been hardly explored in rural West Bengal. **Objectives:** This study was formulated to construct a women's empowerment index (WEI), in rural West Bengal, and assess the reliability of the index. **Methods:** A community-based cross-sectional study focusing on Women's Empowerment, Child Health and Nutrition (WE-CHANT) was conducted in a community development block in West Bengal. Mother (of reproductive age)–child (6–59 months) pairs were recruited from 20 villages by two-stage sampling (n = 268). Mothers were interviewed. Exploratory factor analysis (EFA) with oblique rotation was conducted with 25 measurement variables to construct the WEI. The internal consistency was assessed with Cronbach's alpha, item-rest, average inter-item, inter-domain, and domain-to-index correlation. **Results:** A 12-item (factor loading ≥0.40) WEI comprising three domains—decision-making power, attitude toward gender-based violence (GBV), and social independence—was constructed with acceptable internal consistency (Cronbach's alpha = 0.747). The multidimensionality of the index was also observed. **Conclusion:** A concise agency-based WEI was constructed, where decision-making power was explored as the major domain. This index in the context of rural West Bengal could be further utilized to assess women's empowerment and elicit its association with resources and achievements.

Keywords: Empowerment, factor analysis, index, rural, women

INTRODUCTION

Women's empowerment is a debated, complex, multidimensional concept.[1] Although it is widely recognized as a precondition of sustainable development, no universal definition or measure is available for women's empowerment.[1-3] Kabeer's conceptual framework defined empowerment as a "process of change" attributed to women's ability to make choices and detailed three interrelated pillars: resources, agency, and achievement. Resources, such as economic status and education, act as a precondition of decision-making power, self-efficacy, etc., (agency), which helps to achieve transformative power in terms of betterment in health and other social sectors (achievement).[4] VeneKlasen and Miller described the concept as a process of transformation from a limited to an enhanced state of power and suggested three levels of change: personal, relational, and environmental. At a personal level, concepts, such as perception about the role of women in family and society, nonacceptance of gender-based violence (GBV), and autonomy, were identified. Control over household assets and decision-making (relational), access to services and resources (environmental), etc., defined the other levels.[5,6] Among several other constructs reported, the most consistent components were resources as an enabling factor and agency as the core of empowerment.[2,3,7,8] Earlier, Sen's ideation of development as freedom highlighted the concept of human agency as a central process in gaining freedom to make own choices, leading to empowerment.[1,9]

Studies were conducted to develop the women's empowerment index (WEI) using large-scale country-wide survey data.[3,10] However, these indices were population-specific.[3,11] Although

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Access this article online

Quick Response Code:

Website:
www.ijcm.org.in

DOI:
10.4103/ijcm.ijcm_409_22

in the Indian scenario, studies were conducted on WEI, considering the variation of human agency across the diverse population, perhaps the development of a universal model was not the choice.[12-15]

This background understanding rationalizes the region and context-specific index to measure women's empowerment. However, very few such attempts were reported in rural locations in West Bengal, a state in eastern India. Such efforts were much more needed amid this coronavirus disease 2019 (COVID-19) pandemic to put women and girls at the center of COVID-19 recovery efforts, as urged by the United Nations.[16]

This study was formulated to construct a context-specific index of women's empowerment in a rural setting in West Bengal, India, focusing on the agency component. The resources and achievement components were also measured to elicit the interrelationship, which is not elaborated on in the present manuscript.

METHODOLOGY

Study settings

A community-based cross-sectional study focusing on Women's Empowerment, Child Health and Nutrition (WE-CHANT) was conducted in a rural field practice area located within a community development block in West Bengal state of India. This rural field serves 64 villages, covering approximately a third of the community development block. Data collection was performed from June to August 2021, using a two-stage sampling method. Mother–child pair (currently married women of reproductive age group having at least a living child between 6 and 59 months of age), the final unit of observation, was selected from 20 villages. Mothers were interviewed, and WEI was constructed from the data employing exploratory factor analysis (EFA).

Sample size

The sample size for the cross-sectional study, WE-CHANT, was calculated based on previously reported under-five undernutrition (36.1%) in a rural setting in West Bengal.[17] Using the Cochran formula with 7.5% absolute error, design effect (1.5), and 10% non-response rate, 280 samples were targeted (14 from each of the 20 villages). Finally, 268 data were collected. For factor analysis, a sample size of at least ten times the number of variables was considered sufficient.[18] Thus, a sample size of 268 appeared adequate for constructing a WEI by EFA with a maximum of 26 measurement variables.

Method of data collection

In the first stage, 20 villages (primary sampling units) were selected by simple random sampling methods from the list of 64 villages. In the second stage, 14 households with an eligible mother–child pair were selected by the random walk method. Trained female data collectors interviewed selected mothers with a predesigned and pretested structured questionnaire after having written informed consent. In the case of more than one

eligible respondent (pair) in one household, the mother of the youngest child (aged between 6 and 59 months) was selected.

Mothers were interviewed in the local (Bengali) language. Information regarding the demographic and socioeconomic details of the family was collected. COVID-19-appropriate behavior was maintained during the time of data collection.

Measurement variables for women's empowerment

Potential questions to construct empowerment were selected after a review of the literature. Response categories to the questions were coded in such a direction where higher values reflected higher levels of empowerment. Having a mobile phone, money for independent use, bank account, taking loan for business, etc., binary outcome responses were coded as no (0) and yes (1). The frequency of reading newspaper, listening to radio, and watching television were coded as not at all (0), less than once a week (1), and at least once a week (2). Freedom of visiting the market, health center, and places outside of the village were recorded with not at all (0), with someone else only (1), and alone (2) options. Responses to the justification of wife beating, no, yes, don't know, and no answer, were subsequently re-coded (yes, don't know, or no answer = 0 and no = 1). Questions on perception about women's role in household and community had four-point Likert scale options, disagree, partly disagree, partly agree, and strongly agree, and re-coded (from 1 to 4) before analysis. Responses for property ownership were also re-coded (the property is owned alone or jointly = 1 and does not own = 0). Participants were asked about the decision-maker for utilization of the money earned, major household purchases, health care, visiting other family members, etc., to understand the decision-making power in the household. Initial responses with either of the options, such as someone else in the house; husband; someone else and the respondent jointly; respondent and husband and someone else jointly; respondent and husband jointly; and respondent alone, were re-coded (where the respondent was not at all involved in decision-making = 0 and where she was involved solely or jointly in decision-making = 1). Women, if engaged in any form of work, were considered to be working (1) otherwise as homemakers (0).

Statistical analysis

The WEI was constructed with EFA, using 25 measurement variables. Bartlett's test of sphericity (with *P* value < 0.05) and Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy (KMO value greater than 0.70) were used to assess the fitness of the variables for factor analysis.[19] The objective of the factor analysis was to identify factors (latent variables) that define the interrelationship among measurement variables (items), not merely data reduction; hence, the principal factor method was preferred over the principal component analysis.[20]

Factors were retained based on visual inspection of the Scree plot and the Kaiser criteria of eigenvalues greater than 1.[20] As the factors could be intercorrelated, an oblique rotation with the direct oblimin method with the Kaiser normalization technique was followed to obtain the simple structure. Factor loading value of ≥0.40 were considered meaningful.[21]

Subsequently, the factors were termed meaningful theoretical domains, and variables under the domains were considered items. A factor with at least three variables was desirable. Factors incorporating two items were only considered if the inter-item correlation was very strong (≥0.5).[22]

The internal consistency of the index was assessed with multiple statistics. First, the item-rest (corrected item-total) correlation, which measures the correlation between an item and an index constructed with the rest of all other items, was calculated. A minimum item-rest correlation value of 0.20 was set to include the items in the final index.[21] Average inter-item correlation was also assessed, with a desired value within 0.15 to 0.50.[23] Cronbach's alpha (hereafter mentioned as alpha) of the index and individual domains were calculated. For each item, changes in the alpha of the index if the item had been removed were also calculated. An alpha value of ≥0.70 was considered satisfactory.[24] Both dichotomous and polytomous nature responses were considered; hence, standardized correlation and alpha values were reported to adjust for the different types of scales used. The multidimensionality of the index was assessed by the correlation between domain scores (mean of standardized items). Weak correlation (correlation coefficient <0.40) between domains and strong correlation (correlation coefficient ≥0.60) between individual domains and overall index indicate separate entities of each domain within a single index.[25] All statistical analysis was performed with Stata version 17.0.

Ethical statement

Ethics approval was obtained from the institutional ethics committee. Participation was voluntary, only after providing written informed consent, and the participant did not have to bear any expenses of their own. The confidentiality of the participants was maintained.

RESULTS

The median age of the participants (n = 268) was 26 years (interquartile range (IQR) 23–26). The median years of schooling was 10 (IQR 9–12). The majority (87%) were homemakers. Tables 1, 2, and 3 represent the responses to questions intended to construct the WEI, incorporating economic freedom, social independence, attitude to GBV, the role of women in society, asset ownership, household decision-making, etc.

EFA using 25 variables (Bartlett's test of sphericity, P value < 0.001 and KMO = 0.711) revealed four factors with eigenvalue more than 1, depicted in the Scree plot [Figure 1]. The results of factor loading after direct oblimin rotation showed 14 items with rotated factor loading values of ≥0.40. The fourth factor with two items was not considered further, and 12 items were retained [Table 4].

Reliability statistics revealed an item-rest (corrected item-total) correlation value of ≥0.20 for all retained items. The average inter-item correlation ranges from 0.184 to 0.213. The alpha of the 12-item index (0.747) was within an acceptable range.

All the individual domains were reported with an alpha value of ≥0.70, with domain 3 (social independence) with the highest alpha value (0.782) [Table 5]. The correlation between domains always remains weak, whereas that between domains and index is strong [Table 6].

DISCUSSION

This study explored a three-factor, 12-item WEI based on data from a rural setting in West Bengal, India, and further assessed the index for internal consistency and multi-dimensionality. The selection of measurement variables was based on established theoretical frameworks and recent studies conducted in different settings.[1,4,6,15] The agency component of empowerment, as described earlier, was given importance over resource and achievement, while selecting variables for EFA to focus on the process of empowerment.[1,9] Hence, neither variables such as age, education, and socioeconomic status (considered as a resource) nor health, nutrition, and feeding status of the child (considered as an achievement) were included in the factor analysis.

Three domains—decision-making power (first domain with four items), attitude toward GBV (second domain with five items), and social independence (third domain with three items)—were identified. Decision-making power appeared to be most influential in his context. This domain has been commonly reported in the construction of WEI in other settings.[2,8,15,26] The social independence domain only incorporates items on freedom of social interactions or movements, such as autonomy in going to the market and health center. To develop a simple and concise index, variables were only considered with higher factor loading (≥0.40) that resulted in the exclusion of other measures of social independence, such as access to newspapers, television, and mobile phones, as observed in other studies.[2,3,10] Few studies also reported a domain termed as mobility, to incorporate items regarding the freedom of social interaction and movements, instead of social independence, as reported here.[27,28] Hence, the construction of the social independence domain as overserved here differs
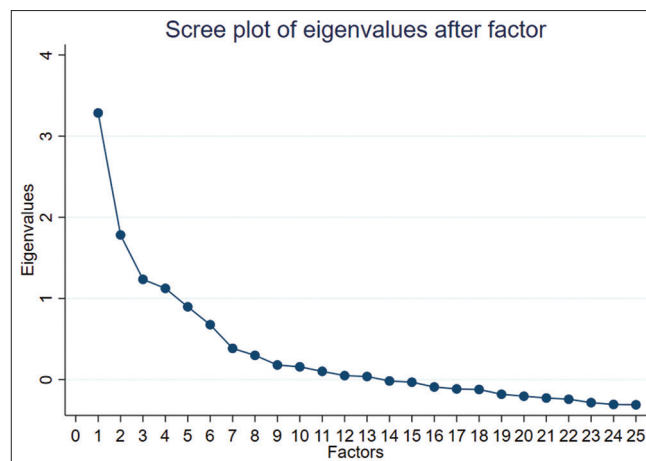

Figure 1: Distribution of eigenvalues against the factors

Table 1: Responses to the questions regarding economic freedom and social independence (*n*=268)

Measurement variables	Responses with number (%)		
	No	**Yes**	
Do you have any mobile phone that you yourself use?	44 (16.4)	224 (83.6)	
Have you ever used the Internet?	119 (44.4)	149 (55.6)	
Do you have any money of your own that you alone can decide how to use?	161 (60.1)	107 (39.9)	
Do you have a bank or savings account that you yourself use?	40 (14.9)	228 (85.1)	
Do you know of any programs in this area that give loans to women to start or expand a business of their own?	110 (41)	158 (59)	
Have you yourself ever taken a loan, in cash or in kind, from any of these programs, to start or expand a business?	225 (84)	43 (16)	
How frequently do you read, listen, or watch the following?	**Not at all**	**Less than once a week**	**At least once a week**
Read a newspaper or magazine at least once a week, less than once a week, or not at all?	191 (71.3)	8 (3)	69 (25.8)
Listen to the radio at least once a week, less than once a week, or not at all?	224 (83.6)	5 (1.9)	39 (14.6)
Watch television at least once a week, less than once a week, or not at all?	50 (18.7)	17 (6.3)	201 (75)
Are you usually allowed to go to the following places alone, only with someone else, or not at all?	**Not at all**	**With someone else only**	**Alone**
Market	26 (9.7)	95 (35.5)	147 (54.9)
Health facility	4 (1.5)	102 (38.1)	162 (60.5)
Places outside this village/community	13 (4.9)	148 (55.2)	107 (39.9)

Table 2: Responses to the questions regarding gender-based violence and the role of women in society (*n*=268)

Measurement variables	Responses with number (%)			
In your opinion, is a husband justified in hitting or beating his wife in the following situations?	**No**	**Yes**	**Don't know**	**No answer**
If she goes out without telling him?	250 (93.3)	18 (6.7)	0 (0)	0 (0)
If she neglects the children?	224 (83.6)	43 (16.0)	0 (0)	1 (0.4)
If she argues with him?	242 (90.3)	25 (9.3)	0 (0)	1 (0.4)
If she refuses to have sex with him?	260 (97.0)	6 (2.2)	0 (0)	2 (0.8)
If she burns the food?	25 7 (95.9)	9 (3.4)	1 (0.4)	1 (0.4)
If he suspects her of being unfaithful?	253 (94.4)	10 (3.7)	4 (1.5)	1 (0.4)
If she shows disrespect for in-laws?	224 (83.6)	38 (14.2)	4 (1.5)	2 (0.8)
To what extent do you agree or disagree with the following statements?	**Disagree**	**Partly disagree**	**Partly agree**	**Strongly agree**
I feel safe to walk alone in my village	23 (8.6)	3 (1.1)	43 (16)	199 (74.3)
Women are just as capable as men of contributing to household income	45 (16.8)	3 (1.1)	55 (20.5)	165 (61.6)
In a family, a man's job is to earn money and a woman's job is to look after home	142 (53.0)	16 (6.0)	52 (19.4)	58 (21.6)
Women are able to be good leaders in social matters and men	27 (10.1)	8 (3.0)	56 (20.9)	177 (66.0)

from the previously reported evidence. Like previous evidence, the domain of justification for GBV also evolved through the exploratory analysis in the present study.[2,8,26,27] A fourth domain, perception of women's role, was identified after the initial factor loading result. The domain had only two items describing perception about the ability and capability of women in social leadership and household income, respectively. A conservative approach was followed to retain a factor with two items only if a strong inter-item correlation was observed. Based on that, the fourth factor was not considered. Unlike some previous findings, asset ownership, working status, and having access to the loan were not evolved under this present construct of empowerment.[2,10,15,27] The model also remains internally consistent both overall and across all three domains. The present study revealed that, in rural West Bengal,

women's empowerment could be assessed based on their decision-making power in the household, nonacceptance of GBV, and, finally, independence of social movements.

Social desirability and misclassification of responses were potential sources of major biases in this study, as some sensitive questions were asked. To minimize that, only female data collectors were employed and confidentiality of the responses was assured before the survey. Responses like, don't know: no answer, were also considered for sensitive questions, which were further re-coded as a negative response. Being quantitative in nature, the exploration of women's empowerment in the study was completely based on the positivist paradigm.

In conclusion, this study tried to construct a simple and concise construct for women's empowerment and finally revealed a

Table 3: Responses to the questions regarding asset ownership and household decision-making (n=268)

Measurement variables	Response with a number (%)					
Do you own any of the following things either alone or jointly with someone else?	**Does not own**	**Both alone and jointly**	**Jointly with husband and someone else**	**Jointly with someone else only**	**Jointly with husband only**	**Alone only**
This or any other house	255 (95.2)	0 (0)	3 (1.1)	1 (0.4)	7 (2.6)	2 (0.8)
Any agricultural or non-agricultural land	260 (97.0)	0 (0)	0 (0)	0 (0)	6 (2.2)	2 (0.8)
Who usually takes decision regarding the following matters in your household	**Someone else in the house**	**Husband**	**Someone else and respondent jointly**	**Respondent, husband, and someone else jointly**	**Respondent and husband jointly**	**Respondent**
Who usually decides how the money you earn will be used?	234 (87.3)	0 (0)	0 (0)	2 (0.8)	13 (4.9)	19 (7.1)
Who usually decides how your husband's earnings will be used?	11 (4.1)	88 (32.8)	4 (1.5)	27 (10.1)	129 (48.1)	9 (3.4)
Who usually makes decisions about making major household purchases?	31 (11.6)	29 (10.8)	7 (2.6)	70 (26.1)	97 (36.2)	34 (12.7)
Who usually makes decisions about health care for yourself?	9 (3.4)	51 (19)	2 (0.8)	27 (10.1)	135 (50.4)	44 (16.4)
Who usually makes decisions about health care for your children?	6 (2.2)	25 (9.3)	4 (1.5)	32 (11.9)	155 (57.8)	46 (17.2)
Who usually makes decisions about visits to your family or relatives?	11 (4.1)	33 (12.3)	4 (1.5)	61 (22.8)	117 (43.7)	42 (15.7)
Who usually makes decisions regarding your participation in community groups, activities, or meetings taking place in your community?	23 (8.6)	40 (14.9)	4 (1.5)	44 (16.4)	104 (38.8)	53 (19.8)
Who usually makes decisions regarding what food to be prepared in your house on a daily basis ?	44 (16.4)	11 (4.1)	31 (11.6)	72 (26.9)	34 (12.7)	76 (28.4)

Table 4: Factor loading after exploratory factor analysis with direct oblimin rotation

Variables	Rotated factor loadings			
	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
Decision-making ability about husband's money	0.552	0.001	0.055	-0.065
Decision-making ability about major household purchase	0.688	-0.024	0.063	0.026
Decision-making ability about own health care	0.694	-0.012	0.061	-0.03
Decision-making ability about visits to family or relatives	0.64	0.112	0.073	0.024
Working status of the women*	-0.054	0.045	0.195	0.28
Owns a land*	-0.058	-0.033	0.15	0.295
Owns a house*	-0.132	-0.023	0.189	0.306
Own some money to use independently*	-0.002	0.019	0.182	0.353
Took loan for starting or expanding business*	-0.005	0.02	0.077	0.25
Freedom of going to the market	0.066	0.038	0.659	0.1
Freedom of going to health facility	0.155	0.006	0.702	-0.099
Freedom of going outside of village	0.065	0.056	0.666	-0.074
Frequency of reading newspaper*	0.024	-0.032	0.202	0.161
Frequency of listening to radio*	0.133	-0.031	0.177	0.04
Frequency of watching television*	0.041	0.186	-0.091	0.348
Owns a mobile phone*	0.125	0.124	0.2	0.111
Beating justified if wife burns the food	-0.03	0.569	-0.041	-0.003
Beating justified if wife refuses to have sex with husband	-0.082	0.434	0.072	-0.105
Beating justified if wife argues with husband	0.073	0.733	0.096	-0.051
Beating justified if wife neglects the children	0.138	0.705	-0.076	0.132
Beating justified if wife goes out without telling husband	-0.011	0.647	-0.052	0.082
Perception about safety of women*	0.238	-0.081	-0.091	0.327
Man's job is to earn money and a woman's job is to look after home*	0.097	0.047	0.067	0.288
Women are just capable as men in contribution of household income$	0.122	0.016	-0.161	0.597
Women are able to be good leaders in social matters$	-0.05	-0.064	-0.125	0.548

Eigenvalue of factor 1, 2, 3, and 4 were 3.286, 1.782, 1.236, and 1.124, respectively. *Items excluded (factor loading <0.40). $items (loaded under factor 4) excluded based on low correlation values between the two items

Table 5: Reliability of items and domains

Items	Item-rest correlation	Average inter-item correlation	Alpha if the item removed	Domain (alpha)	Overall reliability
Decision-making ability about husband's money	0.333	0.202	0.735	First domain: decision-making power (0.771)	*Number of items in the scale* = 12
Decision-making ability about major household purchase	0.404	0.195	0.727		*Average inter-item correlation* = 0.197
Decision-making ability about own health care	0.404	0.195	0.727		*Alpha* = 0.747
Decision-making ability about visits to family or relatives	0.467	0.189	0.719		
Beating justified if wife burns the food	0.271	0.208	0.743	Second domain: attitude toward gender-based violence (0.758)	
Beating justified if wife refuses to have sex with husband	0.22	0.213	0.749		
Beating justified if wife argues with husband	0.52	0.184	0.712		
Beating justified if wife neglects the children	0.455	0.19	0.721		
Beating justified if wife goes out without telling husband	0.342	0.201	0.734		
Freedom of going to the market	0.386	0.196	0.729	Third domain: social independence (0.782)	
Freedom of going to health facility	0.407	0.194	0.726		
Freedom of going outside of village	0.356	0.199	0.733		

→All alpha and correlation values are standardized values

Table 6: Multidimensionality of the index: domain-to-domain and domain-to-index correlations

	Domain 1	Domain 2	Domain 3	Overall index
Domain 1	1			
Domain 2	0.1353*	1		
Domain 3	0.2818*	0.1255*	1	
Overall index	0.6923*	0.6965*	0.6194*	1

*correlations are statistically significant at α=0.05

12-item three-domain construct incorporating decision-making power, attitude toward GBV, and social independence, which showed acceptable internal consistency. Decision-making power appeared to be the strongest predictor of women's empowerment in this setting.

Conflicts of interest
There are no conflicts of interest.

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